Utah Department of Environmental Quality

"Climate Change Symposium: Climate Policy (Part I): Cap and Trade Programs"

April 24, 2007

“No one should underestimate the challenge of de-carbonizing an economy that has relied on carbon-based fuels for two centuries.”

Testimony of David L. Sokol, Chairman and CEO
MidAmerican Energy Holdings Company
Subcommittee on Energy and Air Quality, Committee on Energy and Commerce
U.S. House of Representatives
March 20, 2007

U.S. Electricity Consumption & Emissions

Electricity is the leading economic sector source of greenhouse gas emissions, but …

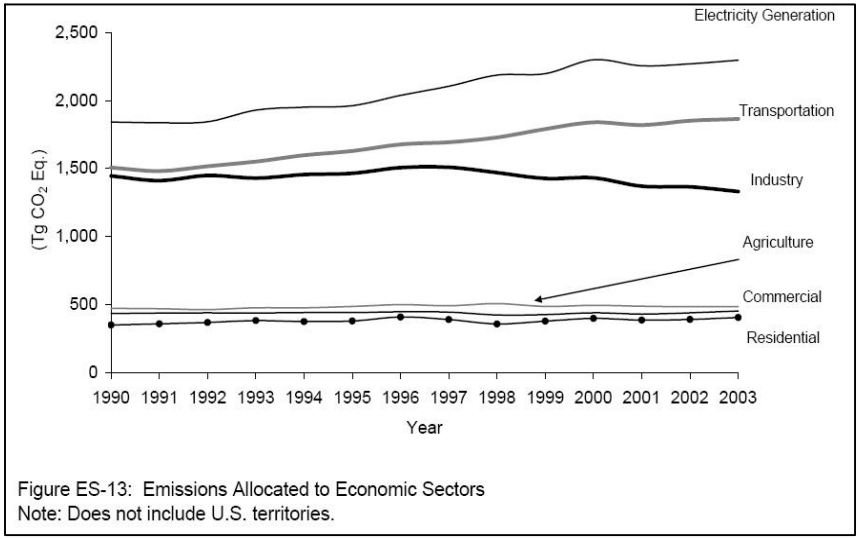


Figure ES-13: Emissions Allocated to Economic Sectors
Note: Does not include U.S. territories.

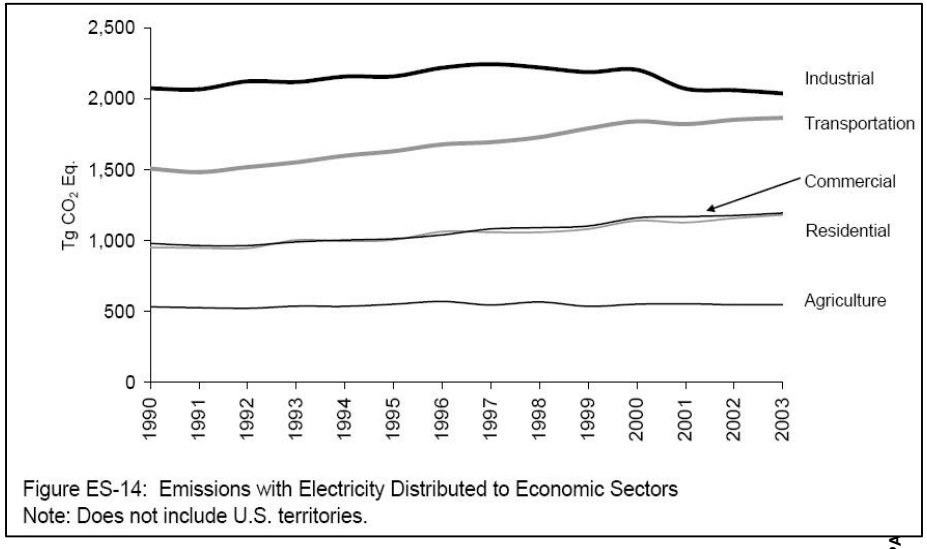
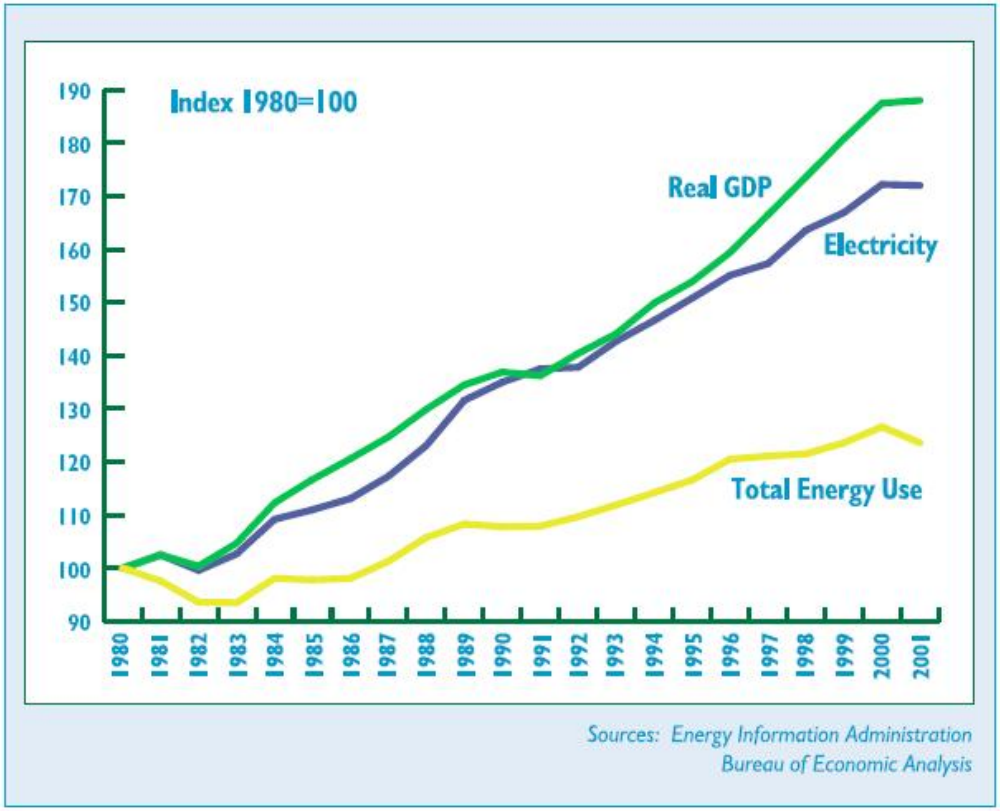


Figure ES-14: Emissions with Electricity Distributed to Economic Sectors
Note: Does not include U.S. territories.

… the emissions are ultimately distributed to other economic sectors.

Economic & Electricity Growth

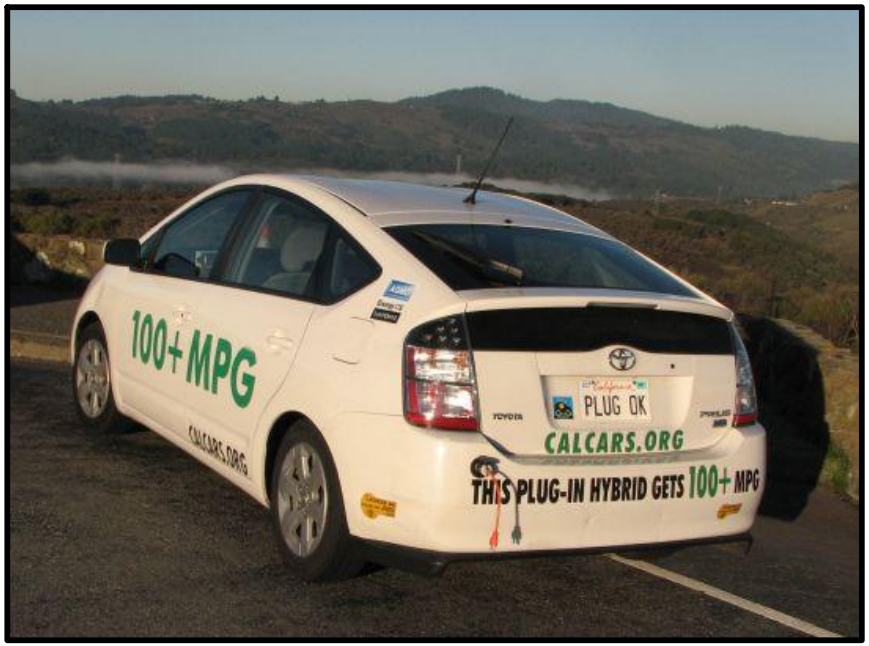
- U.S. economic growth is closely linked to electricity growth
  - Electricity consumption is likely to continue its upward trajectory, becoming more valuable
  - Two-thirds of U.S. GDP now come from industries and services now fueled by electricity



There Are Even More New Growth Opportunities

- All the high-growth, information-centered sectors of the U.S. digital economy run entirely on electricity

- Electricity may also take over the power train in vehicles resulting in beneficial fuel switching (e.g., traditional mechanical-hydraulic systems are being replaced with digital-electric systems)



The Prius "plug-in" hybrid

Designing Federal "Carbon" Legislative Proposals

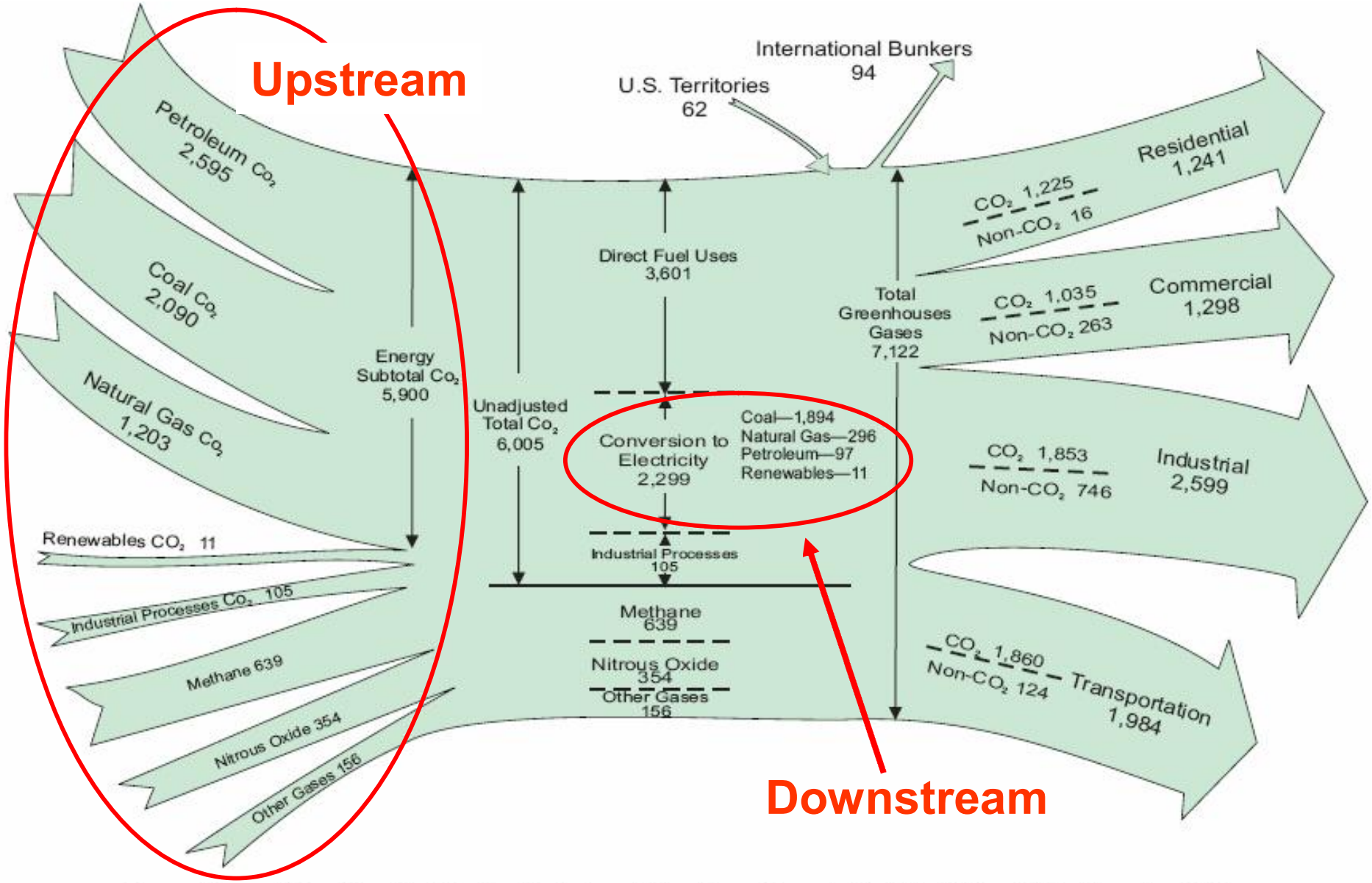
Options

- Mandatory versus voluntary
- Economy-wide or sectoral approach
- Upstream, downstream or hybrid point of regulation

Observation

"With a a cap and trade rule's safety valve (or a carbon tax), the policy costs are known, but the actual emissions reductions are uncertain."

"With an emissions cap, emissions reductions are known, but the costs are uncertain."



Source: Energy Information Administration, Emissions of Greenhouse Gases in the United States 2004. December 2005

Senate White Paper Comments (2006) …

Upstream Preference:

- Cinergy, Conectiv Energy, Duke Energy, Exelon, Progress Energy, Puget Sound Energy, and TXU

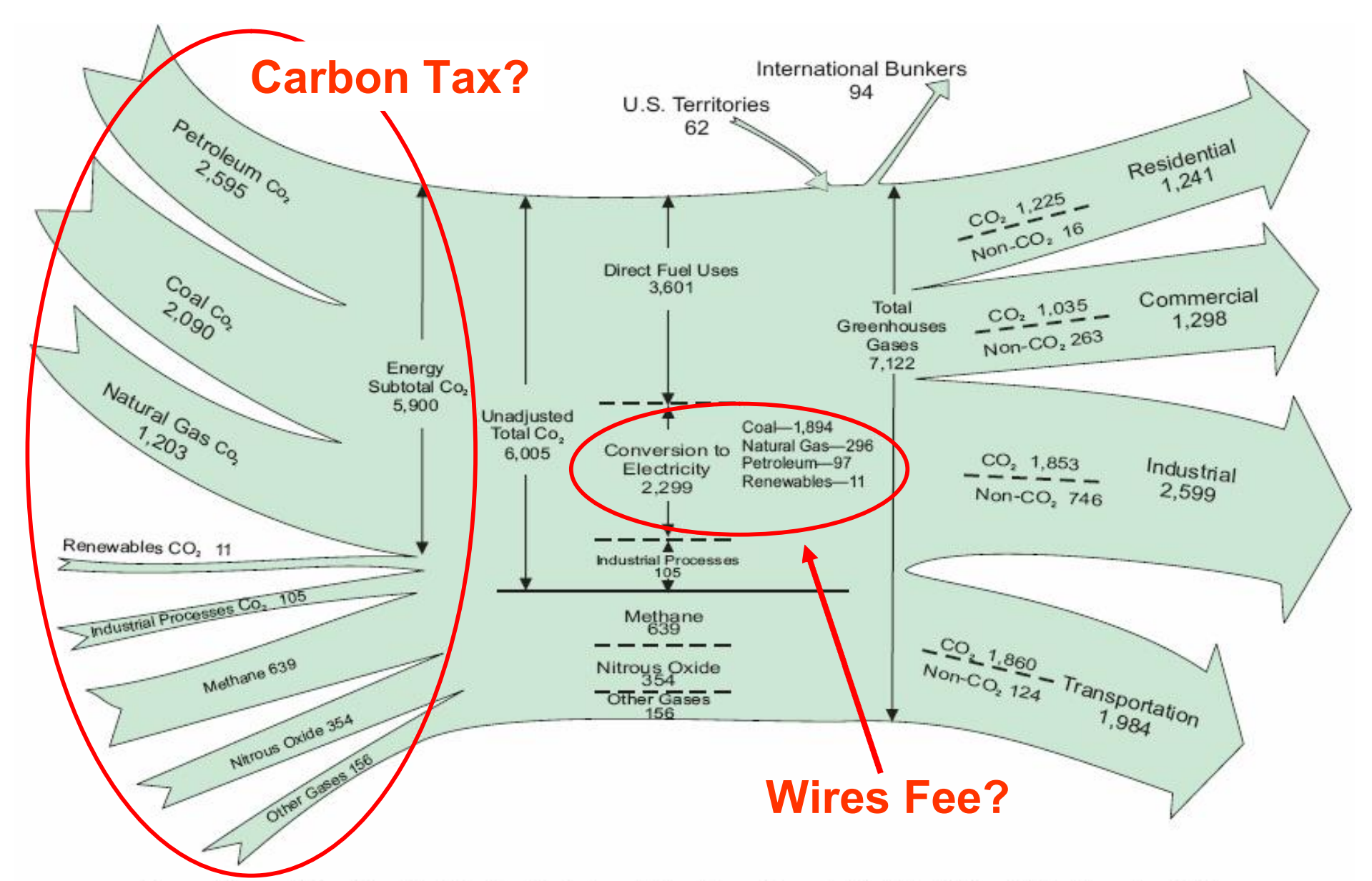
Hybrid Preference:

- AEP, Calpine, Entergy, FPL, PG&E, PNM, PSEG, and Southern Company

Options Part 2

You've Decided to Regulate …

- Carbon tax
- Cap and trade program
- Cap and trade uses absolute emission reductions versus intensity reductions
- Stringency of cap
- "Ratchet" schedule (how quickly)



Source: Energy Information Administration, Emissions of Greenhouse Gases in the United States 2004. December 2005

Options Part 2

You've Decided to Regulate …

- Carbon tax
- Cap and trade program
- Cap and trade uses absolute emission reductions versus intensity reductions
- Stringency of cap
- "Ratchet" schedule (how quickly)

Let's look at some examples ...

Upstream

Point of Regulation And Allowance Recipients

allowances are surrendered by fuel providers to EPA

Fuel Providers

fuel providers pass on higher fuel costs

End-Use Consumer

Some portion of the allowances allocated at no cost to fuel providers

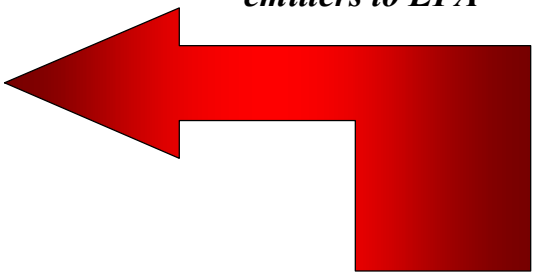
Large Emitters

PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

Pacific Power | Rocky Mountain Power | PacifiCorp Energy

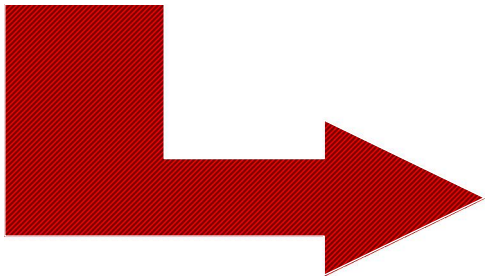
Downstream

allowances are surrendered by large emitters to EPA

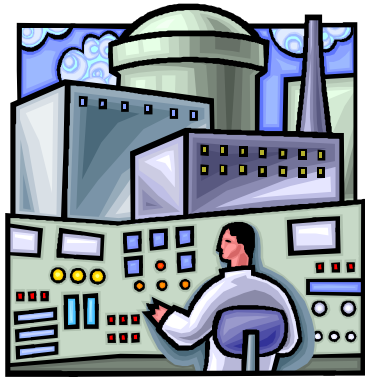


End-Use Consumer

the free allowances absorb a portion of the higher product costs



some portion of the allowances are allocated at no cost to large emitters



Large Emitters

Point of Regulation and Allowance Recipients

Hybrid

Point of Regulation
Fuel Providers

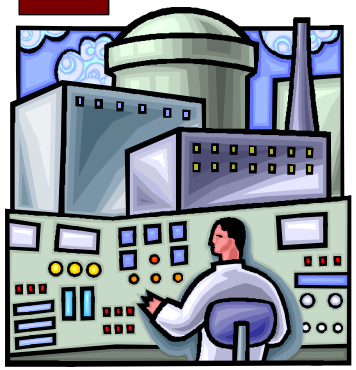
allowances are surrendered by fuel providers to EPA

fuel providers pass on higher fuel costs

End-Use Consumer

allowances are sold by large emitters to fuel providers

proceeds from allowance sales used to absorb portion of product costs



some portion of allowances are allocated at no cost to large emitters

Large Emitters
Allowance Recipients

PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

Pacific Power | Rocky Mountain Power | PacifiCorp Energy

Observation

"A cap and trade rule may either be 'load-based" or 'source-based"

"Load-based rule applies to a load serving entity, while a source-based rule applies to a generator"

Options Part 2

You've Decided to Regulate …

- Carbon tax
- Cap and trade program
- Cap and trade uses absolute emission reductions versus intensity reductions
- Stringency of cap
- "Ratchet" schedule (how quickly)

Absolute Emissions

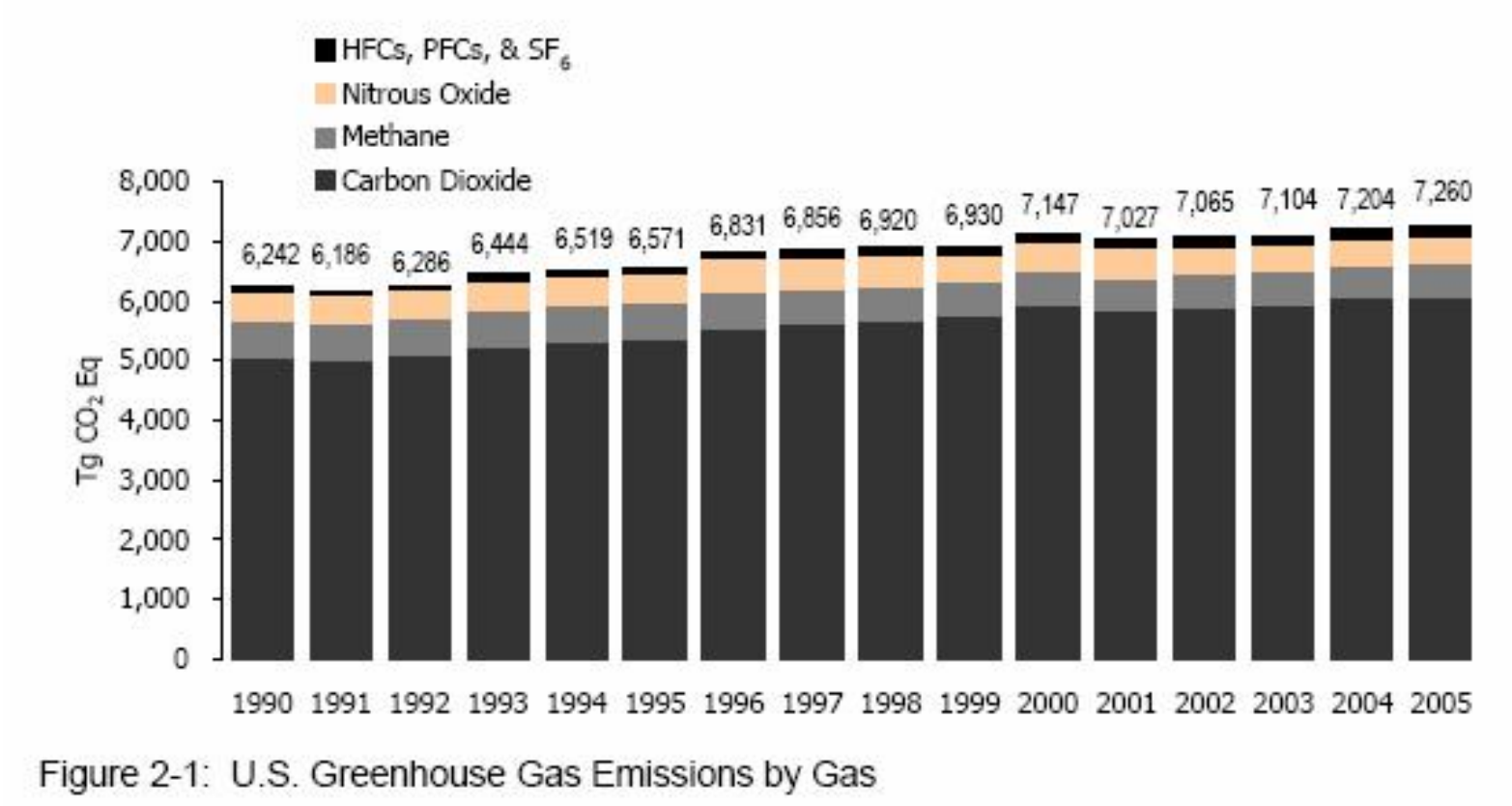


Figure 2-1: U.S. Greenhouse Gas Emissions by Gas

Source: http://www.epa.gov/climatechange/emissions/downloads06/07Trends.pdf

Emissions Intensity

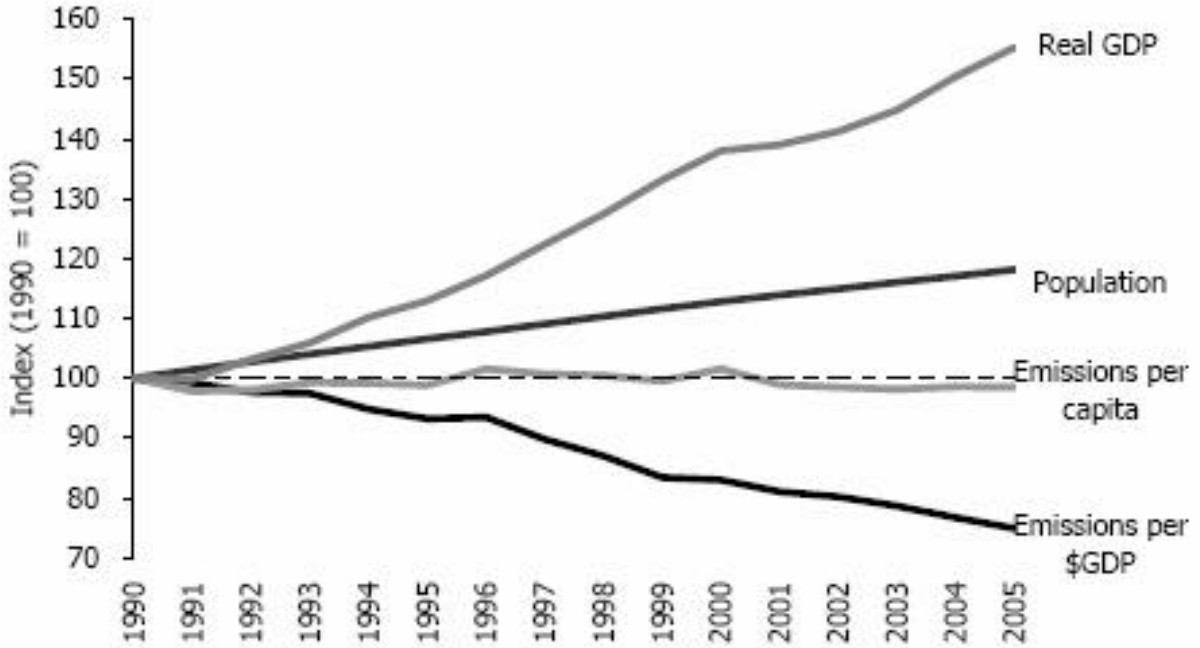
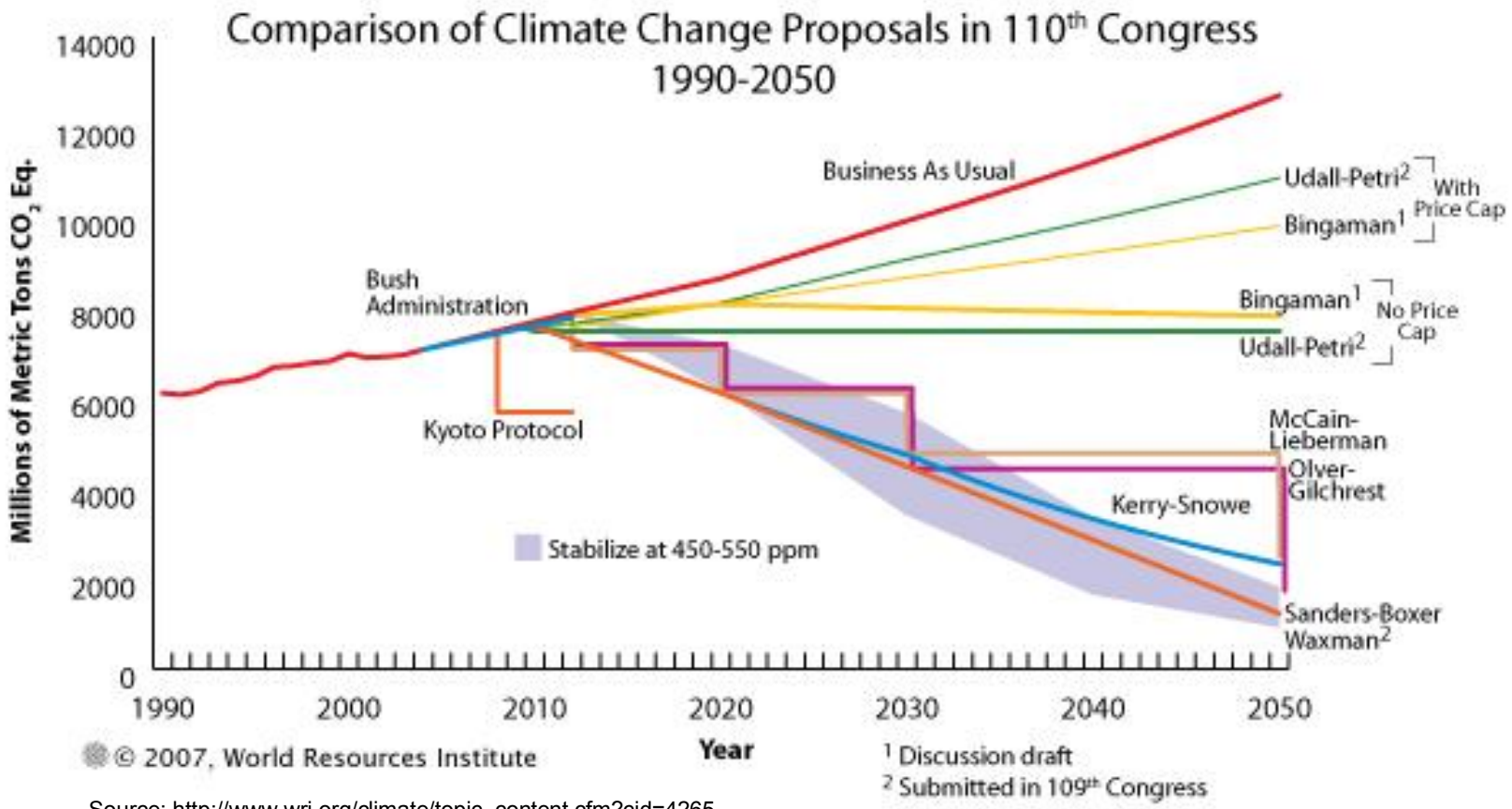


Figure 2-4: U.S. Greenhouse Gas Emissions Per Capita and Per Dollar of Gross Domestic Product

Source: http://www.epa.gov/climatechange/emissions/downloads06/07Trends.pdf

There are Different Caps and Schedules



Source: http://www.wri.org/climate/topic_content.cfm?cid=4265

Options Part 3

Allowance Allocations …

- Who should receive them
- Regulated entities or those that "bear the cost"
- Input or output based allocation methodology
- Baseline updated over time or fixed
- Grandfathered or auctioned allowances

There Are Regional Differences

Table 8.2 eGRID Subregion Annual Average CO_2 Output-Based Emission Rates (Year 2000 – Total Energy)

eGRID Subregion Name	eGRID Subregion Acronym	CO_2 Output Emission Rate (lbs/MWh)
ASCC Alaska Grid	AKGD	1,399.95
ASCC Miscellaneous	AKMS	757.81
ECAR Michigan	ECMI	1,632.06
ECAR Ohio Valley	ECOV	1,966.53
ERCOT All	ERCT	1,408.27
FRCC All	FRCC	1,390.04
HICC Miscellaneous	HIMS	1,702.93
HICC Oahu	HIOA	1,721.69
MAAC All	MAAC	1,097.56
MAIN North	MANN	1,761.09
MAIN South	MANS	1,237.29
MAPP All	MAPP	1,838.83
NPCC Long Island	NYLI	1,659.76
NPCC New England	NEWE	897.11
NPCC NYC/Westchester	NYCW	1,090.13
NPCC Upstate NY	NYUP	843.04
Off-Grid	OFFG	1,706.71
SERC Mississippi Valley	SRMV	1,331.34
SERC South	SRSO	1,561.51
SERC Tennessee Valley	SRTV	1,372.70
SERC Virginia/Carolina	SRVC	1,164.19
SPP North	SPNO	2,011.15
SPP South	SPSO	1,936.65
WECC California	CALI	804.54
WECC Great Basin	NWGB	852.31
WECC Pacific Northwest	NWPN	671.04
WECC Rockies	ROCK	1,872.51
WECC Southwest	WSSW	1,423.95

eGRID2002 Version 2.01 Location (Operator)-Based eGRID Subregion File (Year 2000 Data)

Observation

"The point of regulation can be different from who may be allocated allowances."

"Some portion of the allowance budget may be allocated for free, along with the balance being auctioned."

"An auction of the allowances may be phased in over time."

Output-Based Methodology

"Providing allowances to nonemitters based on the so-called output-based methodology will simply create large wealth transfers unrelated to the overall goal of emissions reduction.

Although I understand the desire of some to profit as a result of global climate legislation, it's unclear what public purpose would be served by distributing allowances to non-emitters. Companies that built hydroelectric dams many decades ago or nuclear plants in the sixties and seventies did not do so to avoid CO_2 emissions and there is no reason to provide them with a financial windfall."

Testimony of David L. Sokol, Chairman and CEO
MidAmerican Energy Holdings Company
Subcommittee on Energy and Air Quality, Committee on Energy and Commerce
U.S. House of Representatives
March 20, 2007

Auction of Allowances

"You may also consider auctioning all allowances, but providing a proportionally lower safety valve price. In other words, rather than providing allowances for ninety percent of historic demand in the first years of a program with a safety valve price of $10 per ton for the remainder of allowances, you could auction all allowances with a safety valve price of $1 per ton.

This is economically neutral and would save you the inherently political process of determining allocations, helping avoid some of the allocation fiascos that we have seen in the European Union."

Testimony of David L. Sokol, Chairman and CEO
MidAmerican Energy Holdings Company
Subcommittee on Energy and Air Quality, Committee on Energy and Commerce
U.S. House of Representatives
March 20, 2007

Options Part 4

Flexible Compliance Mechanisms …

- Banking and Borrowing of allowances
- Safety valve
- Circuit Breaker
- Credit for early action
- Availability of off-system carbon offsets

Options Part 5

If it is a cap and trade (con't) …

- Who gets to participate in the market (banks?)
- How do you handle new entrants
- Link to other sector programs within the economy
- Link to another country's program

Options Part 6

Use of revenues (e.g., tax or auction proceeds)

- Technology incentives
- Adaptation assistance
- Consumer protection
- Other set-asides

Average Annual Funding Needs (2005-30)

(including nuclear closed fuel cycle, CO_2 storage)

	Research	Development	Demonstration	Early Deployment	Enhanced Performance	Total
DISTRIBUTION INTEGRATION Smart grids and communications infrastructures to enable end-use efficiency and demand response, distributed generation, and PHEVs.	$25M/yr	$51M/yr	$64M/yr	$80M/yr	$0M/yr	$220M/yr
GRID INTEGRATION A grid infrastructure with the capacity and reliability to operate with 20-30% intermittent renewables in specific regions.	$40M/yr	$80M/yr	$70M/yr	$33M/yr	$117M/yr	$340M/yr
NUCLEAR Significant expansion of nuclear energy enabled by continued safe and economic operation of existing nuclear fleet; and a viable strategy for managing spent fuel.	$247M/yr	$493M/yr	$40M/yr	$0M/yr	$40M/yr	$820M/yr
ADVANCED COAL, CO2 CAPTURE and STORAGE Commercial-scale coal-based generation units operating with 90+% CO2 capture and storage in a variety of geologies.	$52M/yr	$91M/yr	$228M/yr	$249M/yr	$0M/yr	$620M/yr
Total (Public + Private Sectors)	$364M/yr	$716M/yr	$401M/yr	$362M/yr	$157M/yr	$2000M/yr

EPRI ELECTRIC POWER RESEARCH INSTITUTE

PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

Pacific Power | Rocky Mountain Power | PacifiCorp Energy

Kyle L. Davis
Manager of Environmental Policy & Strategy
PacifiCorp
825 NE Multnomah, Portland, OR 97232
(503) 813-6601 Phone
(503) 813-7247 Fax
E-Mail: Kyle.L.Davis@PacifiCorp.com
www.pacificorp.com